Do not write on examination. Please put responses on answer sheet.

1-19. Label the layers of the skin and structures on answer sheet.

Word bank: hair bulb, sensory nerve, arrector pili muscle, hypodermis, sweat pore, Stratum corneum, arteriole, motor nerve, sweat gland, hair follicle, adipose tissue, stratum granulosum, dermis, sebaceous gland, hair, stratum spinosum, epidermis, venule, stratum basale

20. The __________ is the primary relay station for sensory information coming into the cerebral cortex.
   a. Hypothalamus
   b. Midbrain
   c. Thalamus
   d. Pineal gland
21. An increase in sympathetic activity will cause airway diameter to
a. Increase
b. Decrease
c. Stay the same
d. No effect at all

22. The __________ is the autonomic control center.
   a. Pons
   b. Hypothalamus
   c. Prefrontal cortex
d. Thalamus

23. Which of these is NOT considered to be a cause of acne?
   a. Hormones, especially testosterone
   b. A diet rich in fatty foods and chocolate
   c. Abnormal keratinization of hair follicles
d. An increase in sebum production
e. The bacterium Propionibacterium acnes

24. A major function of the skin is protection from
   a. Abrasion.
   b. Ultraviolet light.
   c. Entry of microorganisms.
d. Dehydration.
e. All of these

25. Which of the following is not true about neurons?
   a. The axon carries nerve impulses toward the cell body.
b. It is the basic functional unit of the nervous system.
c. It transmits impulses up to 250 mph.
d. The myelin sheath insulates the neuron.

26. The spinal cord:
   a. Contains only sensory neurons
   b. Contains only motor neurons
c. Contains only interneurons
d. Is exactly as long as the vertebral canal
e. None of the above

27. Why do some health professionals say marijuana can help people with end-stage cancer?
   a. It mimics the neurotransmitter anandamide.
b. It increases GABA (gamma-aminobutyric acid).
c. It limits dopamine activity.
d. It stimulates epinephrine.
28. What is the effect of marijuana on the body because of the correct neurotransmitter response from question 27?
   a. GABA acts as an excitatory transmitter.
   b. Dopamine prevents dependency.
   c. Anandamide helps pain and improves appetite.
   d. Epinephrine stimulation improves sleep.

29. The layer of skin that is composed of dense connective tissue and has projections called papillae is the:
   a. Dermis.
   b. Hypodermis.
   c. Stratum corneum.
   d. Stratum basale.
   e. Stratum lucidum.

30. The specific layer that shapes the ridges for fingerprints and footprints is the:
   a. Hypodermis.
   b. Papillary layer of the dermis.
   c. Reticular layer of the dermis.
   d. Underlying muscle layer.
   e. Superficial bony layer.

31. Cell division occurs in which layer of the epidermis?
   a. Stratum basale
   b. Stratum corneum
   c. Stratum granulosum
   d. Stratum lucidum
   e. Stratum reticularis

32. Classic presenting symptoms that indicate a patient has multiple sclerosis include:
   a. Resting tremors, loss of peripheral vision
   b. Severe pain along a dermatome and rash
   c. Drainage and redness of eye
   d. Visual disturbance, numbness, and motor weakness.

33. What part of the brain would you expect to be the most involved in throwing a football?
   a. Pons
   b. Thalamus
   c. Adenohypophysis
   d. Cerebellum

34. Which of the following is not true?
   a. The cerebral hemispheres make up about 80% of the brain.
   b. Ridges in the cerebrum are called sulci.
   c. The longitudinal fissure separates the 2 cerebral hemispheres.
   d. The central sulcus separates the frontal and parietal lobes.
Read the scenario and use your knowledge of the integumentary system to answer questions 35 through 40. Each worth 3 points.

Chief Complaint: 8-year-old girl admitted for severe second- and third-degree burns following her rescue from a burning house.

History: Angela, an 8-year-old white female, was transported by ambulance to the emergency room after being rescued from her burning house. She was asleep at night when a spark from the family fireplace started a fire, leaving her trapped in her bedroom. By the time the fire rescue squad arrived, she had suffered severe burns and excessive smoke inhalation.

In the emergency room, Angela was unconscious. She had second-degree burns over 5% of her body and third-degree burns over 15% of her body -- both covering her thoracic and abdominal regions and her right elbow. Her vital signs were quite unstable: blood pressure = 55 / 35; heart rate = 210 beats / min.; and respiratory rate = 40 breaths / min. She was quickly deteriorating from circulatory failure. Two IVs were inserted and fluids were administered through each. Her vital signs stabilized and she was transported to the pediatric intensive care unit (ICU).

Angela regained consciousness the following morning, surprisingly complaining of only minor pain over her trunk. Following debridement of her burns and application of a broad-spectrum, topical antibiotic, a plastic epidermal graft was applied over the burned areas. Despite treatment with a broad-spectrum antibiotic, she developed a systemic staphylococcal infection, necessitating a switch to a different antibiotic.

Angela began a long, slow recovery. Her position in bed had to be changed every 2 hours to prevent the formation of decubitus ulcers (i.e. bedsores). She lost 9 pounds over the next 3 weeks, despite nasogastric tube feeding of 5000 calories ("Kcals") per day. After 9 weeks, sheets of cultured epidermal cells were grafted to her regenerating dermal layer. By the 15th week of her hospitalization, her epidermal graft was complete, and she was back on solid foods, her antibiotics were discontinued, and she was discharged from the hospital with a rehabilitation plan for both physical and occupational therapy at home, as well as twice-weekly visits by a nurse.

See end of test for answers.

35. Why was this girl relatively pain-free when she woke up?

36. Explain why this patient's blood pressure was so low and her heart rate so high upon arrival at the emergency room.

37. Why was it important to immediately administer intravenous fluids to this girl?

38. Why was skin-grafting necessary in this patient? (Why not just let the skin heal on its own?)

39. Why did the patient lose so much weight despite being on a very high-calorie diet?

40. What long-term problems may the patient have as a result of extensive scar tissue formation over her trunk and her right elbow?
Label eye diagram for 41 through 49.

50. The _________ consists of many layers of dead squamous cells surrounded by lipids.
   a. Dermis  
   b. Hypodermis  
   c. Stratum corneum  
   d. Stratum basale  
   e. Stratum spinosum

51. Cyanosis is a condition caused by
   a. Consuming large amounts of carotene.  
   b. Increased blood flow to the skin.  
   c. Albinism.  
   d. Exposure to ultraviolet light.  
   e. Decreases in blood oxygen.

52. Concerning skin color, which of these statements is correctly matched?
   a. Skin appears yellow = not enough oxygen in blood.  
   b. Pale skin = shock.  
   c. Skin tans = increased carotene in stratum corneum
d. Dark skin = less melanin than light skin.
e. Pregnancy = decrease in the production of melanin.

Questions 53 through 57. What do the letters of ABCDE rule of skin cancer stand for?
Asymmetry, Border, Color, Diameter, Elevated (or Evolving)

58. Why will the ABCDE rule help prevent skin cancer?
a. It involves reminder for using sunscreen.
b. It allows for early detection.
c. It predicts a person risk of skin cancer.
d. It increases people's awareness of dermatology.

59. The spinal cord is enlarged at the ____ and _____ regions.
   a. Cervical-thoracic
   b. Thoracic-lumbar
   c. Cervical-lumbar
d. Thoracic-sacral
e. None of the above

60. The 2 divisions of the somatic nervous system are the sympathetic division and the parasympathetic division.
a. True
b. False

61. Which statement is not true?
a. Images seen by the human eye cross over in the optic chiasm.
b. Rods help with dim vision in the eye and cones see color.
c. The blind spot is caused by an abundance of photoreceptors available to use.
d. Rods have a pigment called rhodospin.

Match skin conditions below with descriptions for questions 62 through 67.

62. Painful, blistering skin rash due to varicella-zoster virus  b

63. Skin is red, sore, or inflamed after direct contact with a substance  g

64. An autoimmune pigmentation disorder  f

65. Noninfectious skin condition characterized by patches of dry, silvery scales  e

66. Overgrowth of cells in the stratum spinosum  c

67. Infectious skin condition often on the face that has ruptured bullae with honey colored crust.  h

   a. Basal cell carcinoma
   b. Shingles
c. Squamous cell carcinoma
d. Freckle
e. Psoriasis
f. Vitiligo
   g. Contact dermatitis
   h. Impetigo
   i. Tinea pedis
Tie Breakers
Point used only in event of a tie.

68-72. List the "Rule of 9's" estimation of burn damage for each area.

68. Head 9%
69. Front of torso 18%
70. Groin 1%
71. Leg 18%
72. Arm 9%

73. Can lead poisoning lead to damage to myelin sheath of nerves?
   a. yes
   b. no

74. Which of the following is the most voluntary?
   a. Autonomic nervous system
   b. Somatic nervous system
   c. Peripheral nervous system
   d. Sympathetic nervous system

75. In the classic Christmas movie, Rudolph the Rednose Reindeer, what occupation did Rudolph's elf friend hope to enter?
   a. Doctor
   b. Police officer
   c. Dentist
   d. Actor

76. What is the name of the rabbit friend in the animated Frosty the Snowman?
   a. Peter
   b. Alacazam
   c. Hocus Pocus
   d. Hopalong

(75 and 76 were not scored)

Answers for 35-40 I was pretty lenient with responses if they seem to fit into the answers I listed and showed thought about what skin does and what happens with burns. I thought this was important because kids are more at risk of burns. If you have questions, feel free to call.
35. *destruction of dermal nerve endings
   *most burns were 3rd degree
   *she may develop pain in margins of 3rd degree and in area of 2nd degree

36. *she lost significant part of protective covering with 3rd degree burns
   *inflammatory response causes fluids to leak into surrounding tissues
   *blood pressure drops with volume loss and heart tries to pump faster to compensate.

37. *have to replace what she lost
   *try to prevent from going into shock
   *prevent damage to other internal organs from dehydration

38. *3rd degree take months to heal
   *burn wounds would succumb to complications without grafts
   *grafts will speed overall recovery

39. *Body is undergoing major inflammatory and healing processes
   *Burn victims require 2 times the normal caloric intake
   *pain and fear may have made it hard to eat.

40. *may have trouble breathing--scar tissue may prevent full expansion of thorax
   *may have limited mobility of elbow
   *psychological damage